

*Jackson (5)*

INTRODUCTORY LECTURE

TO THE COURSE OF THE

INSTITUTES OF MEDICINE,

IN THE

UNIVERSITY OF PENNSYLVANIA.

Delivered October 12, 1855.

BY

SAMUEL JACKSON, M.D.

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PUBLISHED BY THE CLASS.

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At a Meeting of the Medical Class of the University of Pennsylvania, held Oct. 18, 1855, for the purpose of requesting a copy of Prof. Samuel Jackson's Introductory Lecture, Mr. Albert H. Smith, of Pennsylvania, was called to the Chair, and Mr. Benj. F. Leonard, of Georgia, appointed Secretary: On motion, it was resolved, that a Committee be appointed to carry out the intention of the meeting, consisting of one from each State, Province, and Country, as follows:—

FREDERICK J. BUCK, <i>Maine.</i>	J. M. R. WESTBROOK, <i>Texas.</i>
JOSEPH S. HILDRETH, <i>Massachusetts.</i>	W. H. HAWKINS, <i>Arkansas.</i>
JOSEPH BIEGLER, <i>New York.</i>	XENOPHON X. XAUF, <i>Missouri.</i>
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AMROSE H. RITZ, <i>Pennsylvania.</i>	W. J. MCNAIRY, <i>Tennessee.</i>
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D. G. COIT, <i>South Carolina.</i>	C. GRAY, <i>Nova Scotia.</i>
W. E. LUNDAY, <i>Georgia.</i>	A. H. CHANDLER, <i>New Brunswick.</i>
J. W. WITHERS, <i>Alabama.</i>	G. T. SANDIFORD, <i>England.</i>
W. W. WHITE, <i>Mississippi.</i>	R. DE MAZEREDO, <i>Cuba.</i>

## CORRESPONDENCE.

UNIVERSITY OF PENNSYLVANIA,  
October 22, 1855.

DEAR SIR: Your Introductory Address was highly appreciated by the Medical Class.

We, the undersigned, have been selected to solicit a copy for publication. Believing that the sentiments it contained cannot fail to ennoble the character and elevate the aspirations of the young and rising members of our profession, we desire to see them widely disseminated. More cultivated minds may find in it nutritious food. In expressing the wish of the Class, allow us to add our own, hoping that our proposition may meet with a favorable consideration.

With sentiments of the highest esteem and respect,

We remain, truly your friends,

CHAS. PENDLETON TUTT,  
JOSEPH S. HILDRETH,  
ALBERT H. SMITH,  
E. BOGARTS VANDYKE,  
HIRAM L. BOWDEN.

TO SAMUEL JACKSON, M. D.

GENTLEMEN: Your application, on the part of the Medical Class of the University, for the publication of my "Introductory Address," very kindly expressed in your note, I cannot refuse.

I was in doubt whether the subject was not too high in pitch, and too grave in tone; it is gratifying to learn it "was appreciated by the Class."

Accept the assurances of my esteem, and believe me,

Very truly yours,

SAMUEL JACKSON.

PHILADELPHIA, October 25, 1855.

TO MESSRS. CHAS. PENDLETON TUTT, JOSEPH S. HILDRETH, ALBERT H. SMITH,  
HIRAM L. BOWDEN, E. BOGARTS VANDYKE.



## LECTURE.

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GENTLEMEN :—

IN the University of Pennsylvania, and most of the medical schools of this country, "the Institutes of Medicine" is one of the courses embraced in the schemes of medical education they have adopted. The introduction of a course of lectures with this designation into the curriculum of the University, and copied by other schools, took place at the time of the fusion of the College of Philadelphia and the University of Pennsylvania, rival schools, in 1791. In the new arrangements of the united schools, under the name of the University of Pennsylvania, the "Institutes of Medicine" were associated with Clinical Medicine as the subjects of one chair, to which Doctor Rush was appointed. Subsequently, on the resignation of Dr. Kuhn the two chairs of Practice and Institutes were consolidated, and Dr. Rush became the incumbent. In the College of Philadelphia, the Institutes were united with Chemistry.

It is most probable that the introduction of the Institutes of Medicine, as a department of medical education, was an imitation of the curriculum of the Edinburgh University, the most celebrated and best known, in this country, of the European medical schools; and where nearly all the most eminent of the American physicians had been educated. At that period Physiology was in a low stage of development; it was not deemed worthy of a distinct course of instruction; or important in its connection with the Practice.

The Institutes of Medicine continued to be united nominally to the chair of the "Theory and Practice" until 1828, when, at the instigation of Professor Chapman, who then occupied the chair, it was separated from his duties and made the subject of a separate professorship.

This arrangement had become indispensable. It had been found impracticable, in the short terms of our medical courses, that sub-

jects, each engaged in a wide field of research, and occupying very different grounds, could be properly handled in such an arrangement. For several years the attempt to teach the Institutes, or even to allude to them, or to any physiological knowledge, had been omitted.

In the meantime Physiology had suddenly sprung up, developed in the proportions of a science, rich in important facts, explaining the functions of the animal economy, and was actively investigating and unravelling the phenomena of life. It was not possible it could longer be ignored and neglected as a branch of medical instruction.

It has been considered a question of doubtful solution whether, at this time, it would not have been preferable to have dropped the title of the "Institutes of Medicine," and substituted that of Physiology for the new chair. This would have made a radical change in the mode of treating the subject, and particularly as to the point of view in which physiological facts and principles are to be regarded.

In the first, or "Institutes," the knowledge of the normal phenomena of the living organism are applied to the illustration of Pathology and Therapeutics; they dovetail into the Practice of Medicine, and elucidate pathological states and laws, the derangement and disturbances of which constitute so large a portion of disease. Pure Physiology has not necessarily a direct relation to those subjects. It may be successfully cultivated without reference to them, and is quite as intimately allied to other subjects of knowledge, as Botany, Chemistry, Hygiene, Medical Jurisprudence, &c.

It is generally understood that, in most of the medical schools in which the title of the Institutes of Medicine has been adopted for a course of lectures, it is pure Physiology that is taught.

Students have been led, from this circumstance, to suppose the Institutes of Medicine and Physiology are identical. They are intimately connected, it is true, but differ widely as to the objects of research—the ends of their investigations, the point of view in which they are regarded, and import attached to them. The same fact has a totally different significance, viewed as a physiological, pathological, therapeutic, or semeiotical fact.

A full course of the Institutes of Medicine is wholly out of the question in the limited time allotted to the courses of our schools; neither is the larger portion of our students sufficiently instructed in the elementary branches of medicine, as General and Minute Anatomy, Physiology and Practice, or their minds prepared by scho-

lastic training in logical methods of thought, to enter into the higher discussions and the generalizations of the Institutes with a capability of fairly comprehending them.

It is then apparent, that the elementary instruction, the groundwork of the Institutes, must of necessity form the primary, and, from their importance, the principal portion of the course. These are the general and special organic structures, forces, actions and functions of the acting or living organism, in its normal or healthy state; in other words, the chief subject of this course will be Physiology.

But, as the Institutes of Medicine, that is the science, the reason of medicine, have been esteemed of primary importance, in this school, from its earliest period, and is the title of the chair I have the honor to hold, I felt it to be a duty, on assuming it, to fulfil the obvious intentions expressed in its designation to the extent that was practicable.

In accordance with this design, the Institutes were taken as the stand-point, from which all the phenomena of the living organism were to be viewed, and to which their relations are sought to be referred, as elucidative of the principles of medicine and immediately applicable to its practice on a scientific basis; or, in other words, the attempt was made and has been carried through imperfectly, but, I believe, for the first time, to make Physiology the key to Pathology and Therapeutics.

The consequence was, that this method of treating physiology exclusively in its connection with medical science, differed in some respects from that of the published works on physiology.

This plan has been adhered to, and has received each year progressive development with the rapid advances and incessant changes resulting from the numerous discoveries and improvements, in Microscopic Anatomy, Organic Chemistry, and Physics, and, through them, of Physiology. For it can no longer be denied that a large portion of physiological facts, or the phenomena of living beings, are not peculiar, limited to, and existing solely in them.

They are now demonstrated to be identical with the facts of the collateral natural sciences, are chemical, physical, mechanical in nature, and are to be studied and investigated precisely in the same manner as the similar facts of the sciences to which they belong.

In order that you may more thoroughly understand the spirit or leading thought that governs my mode of viewing and treating the facts and investigations of Physiology, it will be requisite that you



should know what is the meaning of the designation, "the Institutes of Medicine;" what are the particular objects and subjects of investigation; the intentions aimed at, and the ends accomplished in this department of medicine. Light will be thrown on this subject by a reference to its definition and its history.

The term is derived from the Latin word *institutum*—a statute, decree, edict, general principle, or law: *Publici juris leges et instituta cognoscere*.—CICERO.

The term was doubtless introduced into medicine from the law. It belonged to the Roman or civil law. The Roman jurisprudence had become a chaotic confusion of empirical edicts and decisions accumulated, during 800 years, under the republic and the emperors. A reform was perfected, under the orders of Justinian, by Trebonian and his coadjutors. They accomplished a systematic arrangement, or codification, of which the "Institutes," sometimes called the Institutes of Justinian, composed the general and fundamental principles.

By the Institutes of Medicine are then expressed the general principles, laws, and fundamental axioms, that explain, digest, arrange in appropriate classes and orders according to their special natures and characteristics, the varied phenomena of the living organism of man in health, in disease, under therapeutic or remedial, and organic recuperative influence.

All this can be accomplished by analysis of facts, by experiments, by observation and persevering inquiry, and investigation.

Numerous as are the facts manifested in the living organism, they may be generalized and determined as occurring under similar causes and agencies, with that uniformity of existence, action, states, and condition, that is termed LAW.

The Institutes of Medicine, comprehensively, are the science of medicine, as distinguished from medicine as an art, or an empiricism.

They may be said, in this view, when directed to the treatment of disease, or in the practice of medicine, to be *applied physiology*, as mechanic arts are now named applied mechanics.

It has been shown that the Institutes, by ascertaining the general facts of medicine, and formulating them into laws, elevates it from an empirical art to the rank and dignity of a science.

Now, what is it that constitutes a science? What is to be understood by this expression? From its derivation, *scientia, scio*, I know



its strict meaning is *knowledge*. This does not express the modern idea of science, which is more complex and extended.

Various definitions have been given of it; none are satisfactory. Isidore St. Hilaire defines science to be "the rational knowledge of the truth." This is not explicit. It necessitates the definition of knowledge and truth. Bossuet's attempt is not more happy. It is, that "science is the fruit of demonstration." This also is vague. How is it the fruit, and what is the demonstration?

Science is the product of mental operations; it may with propriety be asserted to be a creation of the intelligence. It is composed of two factors or elements. The first is the just perception and appreciation, by the senses and the proper faculties of the mind, of the positive truth of the phenomena or things of the external world, as separate and distinct from their appearances; a knowledge of them as they really are, and not as they seem to be.

Positive facts, or phenomena, ascertained and identified in all their characteristic properties, are the materials of which the mind constructs science. Positive knowledge and science are mutually convertible terms.

The second factor is the power of discriminating by the rational faculties of the mind, the mutual relations of the phenomena, or things of which it has acquired a knowledge, to each other; and their points of similitude and dissimilitudes, of their agreements and disagreements, of their affinities and repulsions, of their mutual dependence, and the order of succession of each one in any special series in which they are invariably associated, and thus are deduced and established the existence of general, invariable, and universal laws. The apparent chaos of the innumerable phenomena of external existence is replaced by harmony, order, arrangement, and classification, the result of the operations of law. *This* is positive, absolute knowledge, or pure science.

In the preceding discussion, it is apparent that truth is an essential element of positive knowledge and positive science. The question here arises, what is truth? how is it to be known? An answer to these questions is difficult, though there are few individuals who in the least doubt the truth of their ideas and beliefs.

Many attempts have been made to define truth. I will cite some of these definitions, borrowed from M. Isidore St. Hilaire. The celebrated metaphysician, Kant, defines truth to be "the agreement of our representations with the things represented." The definition of Schilling is nearly similar; it is, that "truth exists in the agree-

ment of representations with their objects." A definition by Balnes, a Spanish writer, possesses more scientific precision: "Truth is in things the reality of things: in the understanding, the knowledge of things such as they exist." A definition by Buffon may be mentioned as an evidence of the loose way in which a great philosopher may sometimes express his thoughts: "Truth," he says, "is that metaphysical being of which all the world should have a clear idea."

A nice distinction has been drawn between the true and truth. The true is the reality of the exterior phenomenon or fact. It belongs to the external world. Truth exists in the mind, in the internal, or ideal world created in the intellect. It resides in the ideas formed by the rational faculties (comparison, analysis, reason, and judgment) of the external objects or phenomena, whose existence is made known to the mind by the excited states or impressions of the special sensibilities belonging to the separate senses, acted on by external bodies. Truth is the fact, or phenomenon, examined, investigated, and proved.

Though the truth must reside in the ideas produced by the intellectual faculties, and stored away in the understanding, yet it does not follow that ideas are necessarily the truth. It is far otherwise, as every one knows. The amount of false in the ideas of mankind, generally exceeds infinitely the true. It is the barrier that arrests the progress of science and philosophy, of civilization and religion; that retains man in a state of sin and barbarism, from which he has not emerged; and is the source of a large amount of vice, crime, and wretchedness.

To acquire a clear conception of truth, we must first ascertain the origin of ideas, what they are, and how produced or obtained.

This subject is metaphysical and physiological: it is somewhat abstruse, but may be rendered easy of comprehension by a statement of simple matters of fact. Knowledge and truth, which are no more than a complete exactitude of the ideas possessed by the mind on any subject, with its realities, are resultants of the conjoined operations of the senses, and of the intellectual faculties proper. These are, as will be shown in the physiological views which will hereafter be the subjects of investigation, imagination, comparison, analysis, reason, or causality, and judgment.

The five senses endowed with special sensibilities, that place them in direct relation with the properties of matter, are in contact with the exterior world, and are acted on by external bodies that have the power to excite in a special mode each particular sense.

Thus the luminiferous ether excites, by direct action, the sense of light belonging to the retina, and the internal nervous centres of vision.

Sonorous vibrations excite the sense of sound seated in the auditive nervous apparatus. The touch of bodies on the surface of the skin excites the tactile sense residing in its nervous vesicular tissue, and makes known their presence, peculiar qualities of texture, &c. The senses alone have an immediate relation with the exterior material world.

The mind is wholly incapable of any direct communication with material bodies, or the exterior world. The only relation it possesses is with nervous sensibility. The sole agents, capable of any communication with it, are the special sensibilities; and of them it can have no other cognizance than the excited states, modifications, or disturbances produced in them when acted on by the impressions of external bodies.

The senses are the messengers or internuncios that transmit to the mind the intelligences they obtain by their intercourse with exterior nature. The mind, from its activity and excitement, produced and maintained by the action of the senses, acquires a knowledge of its own existence, whence is derived the idea of personal identity; and a knowledge of an infinitely complicated and variably diversified world, exterior to itself and the body to which it is united, and independent of itself and its corporeal structure. In this manner is obtained the idea of external nature.

The excitations of sensibility, either spontaneously arising as in the internal sensibilities in diseased states, or from external impressions, are known to the mind by the faculty of perception, always accompanied by a sensation. A sensation is the consequence of a transmission of the peripheric or external excitements of sensibility to the interior nervous sensitive centres. The perception of this transmitted excitement to the central organs is at once the cause of sensation and perception. There can be no sensation without perception, or perception without sensation. For each special modification of each special sensibility, there is produced a separate, distinct sensation and perception. The sensations and perceptions are neither more nor less than the number of distinct modifications of which each sense is susceptible. A sensation and perception being excited, the action of the mind is directed to it by its faculty of attention, and an idea is formed of the nature of the exterior body which has caused that special sensation. This is a primary or

radical idea; it is a simple idea, and marks or denotes a single property, as a form, color, feel, sound, smell, or taste of an external body. Being the immediate product of the action of a sense, they form a class that may be designated as sensuous ideas, as distinct from ideas the products of the intellectual faculties and operations, the class of intellectual ideas. The properties of the external bodies of nature are limited, the modifications of the sensibilities are equally limited, and, consequently, the sensations, perceptions, and primary or elementary sensuous ideas cannot be greater in number. The completeness, perfection, and justness or truth of these primary ideas must be influenced to a great extent; first, by the delicacy and fineness of the senses, sensations, and perceptions; and next, on mental acuteness, activity, and power of attention. All individuals are not equally gifted in these respects, and hence proceeds a first source of fallacy and error from the incorrectness of the primary sensuous or elementary ideas proceeding from imperfection in the senses and in mental states or endowments.

The number of primary simple ideas, derived immediately from the senses, cannot exceed at most some forty or fifty. All the knowledge the mind obtains of the exterior world of nature, direct from the senses, is restricted to the phenomena of the special sensibilities; that is, to a sight, a sound, a feel or touch, a smell, and a taste.

The simple or primary ideas underlie all our knowledge; are elementary to the more elaborated ideas that constitute what properly is meant by the understanding, and from which have been constructed our arts, sciences, and philosophy.

The primary ideas derived immediately from the senses are not always accurate. The senses are subject to deception. It is only when their actions are adjusted by reiterated observations and mental operations, and they are reduced to their just value, that they can be trusted as absolutely true. Until this is accomplished, all the derivative thoughts and ideas proceeding from them are vitiated.

Here arises a second source of fallacy and the untrue, corrupting knowledge and distorting truth. The capability of sound observation is a faculty possessed by a limited number. How often has it occurred in every department of knowledge, that thousands of observers have examined a particular subject, and yet overlooked characteristic phenomena obvious to every one when once detected. Still more difficult is it to correct, by the mental operations, the aber-



rations of the senses and the errors of the perceptions; and those fitted for this process by endowment or instruction are very few in number.

The phenomena of the exterior world cognizable by the senses are innumerable; while the senses are limited in their respective capacities of receiving impressions. These phenomena consist of the endless varieties matter manifests in its states, forms, conditions, relations, modifications, and modes of general and especial actions.

These are the subjects of sensations, perceptions, and are represented as simple ideas to the mind, which has thus pictured to it the outward material world. The causes of the incessant activity observed in the inorganic and organic world are not the subjects of sensations and perceptions; they are imperceptible, having no immediate or possible relations with the functions of the sensibilities. Their existence is inferred by the mental act of causation, from the regularity and constancy of certain actions under given conditions.

The phenomena of external nature are complicated; a limited number are simple. They are compounds of different elements forming concrete phenomena, having definite exterior characters, apparently simple while intrinsically of complex nature. The senses cannot penetrate beyond the exterior; the interior lies concealed.

The ideal representation of the senses is that of the superficial exterior appearances and characteristics; it is the verisimilitude of the thing as it appears in nature, but is not the veritable thing as it exists in nature.

The ideal representation of the external world, as presented to the mind by the senses, is delusive, is a phantasmagoria. The true nature of that world, and the mutual relations between it and man, are the problems for the intellectual faculties, the reasoning powers of man to solve. Those faculties, by their powers of comparison, analysis, synthesis, causation, and judgment, break up, decompose the phenomena transmitted to the mind, and resolve them into their component elements.

The mind thus acquires a knowledge of the existences of new phenomena inaccessible to the external senses; they are the subjects of internal or mental sense and perception, and from which result the production of a new kind of ideas—intellectual, rational, or scientific ideas. These ideas the mind arranges according to the special characters they possess into species, genera, orders, classes, divisions, or departments, and thus establishes scientific truth, or the just

interpretation' of the exterior world of nature. Each of these designations expresses aggregates of phenomena and ideas, condensed into a single phenomenon or idea, increasing in composite character and complexity, rising from simple to compound, complex, and abstract ideas. The mental power to form these kinds of ideas, or to comprehend and receive them when struck out by others, constitutes the scientific intellect.

There is a higher class of ideas than the preceding, that require for their production the highest power of the intellectual faculties, a wide field of intellectual vision and vigorous grasp of intellectual thought: they are abstract, or philosophic, as distinguished from scientific ideas and range of thought.

Abstract ideas are axiomatic truths that sum up the principles, laws, and the whole detail of scientific facts.

Science and philosophy are not necessarily united. Men celebrated for scientific attainments are incapable of forming, or even comprehending the abstract ideas, or the philosophic principles of the science, with the particular facts of which they are thoroughly conversant.

The exterior world with which man holds an indissoluble relation, the work of the creative power of God, is the persistent representation in material phenomena of the ideas of His intelligence.

The intellectual faculties bestowed on man are the interpreters of these phenomena. They are endowed with the power of penetrating to the creative idea, and thus is revealed to man the plan of creation, his relations and duties, moral and physical, in the organic and inorganic world, of which he is an integral unit, and, ascending

"From nature up to nature's God,"

has unfolded to him his relations, duties, and responsibilities to his Creator.

Science and philosophy are the interpretation of the actualities of the exterior world, the realities of existence.

The internal intellectual world, the creation of the intellectual faculties, in the scientific and philosophic mind, is not the external world as known to the senses, but the true ideal world existing in the divine intelligence.

If this exposition be a correct and logical deduction from acknowledged facts, a close approximation has been reached to a knowledge of the nature of scientific truth, and an exactness in its definition.

Truth, it is seen, requires the conjoined operation of the senses, and the operations of the intellectual faculties; it cannot proceed from either separately. This important fact was overlooked by Plato and his disciples.

The inadequacy of the senses to the acquirement of intellectual ideas, and discovery of philosophic truth, led them to reject wholly their agency in the production of ideas. They were attributed to an innate and original pre-existence in the mind, awakened or called forth by the action of the senses. The later Platonists of Germany, Schelling, Oken, and other "philosophers of nature," adopted similar views.

In the last number of the *British and Foreign Medico-Chirurgical Review*, is a paper by Dr. Laycock, on the brain, in which the Platonist theory of innate ideas is materialized.

The modern school of Locke, Voltaire, Helvetius, and Condorcet, fell into the opposite error. They were so forcibly impressed with the intimate and absolute connection between the senses, sensibility, and the intellectual states and actions, as to regard sensibility and mind as identical.

The formation of ideas and the intellectual operations were explained as modifications of sensibility. Pleasure and pain, desire and aversion, were considered as the springs of thought, the exciters of mental action.

Each of these metaphysical doctrines had for its basis a fundamental truth, but it was not the whole truth. All the deductions of which they were constructed were consequently fallacious. Famous as they once were, they now have nearly disappeared from the horizon of science, consigned to bibliothecal limbos—the hades of man's created works of knowledge, science, and philosophy, into which truth has not infused an immortal spirit.

From the foregoing investigation of the processes by which knowledge is acquired, truth in science would appear to be the penetration by the intellect into the divine reality of external phenomena.

Divine truth is absolute: it is the idea of the divine intelligence, the archetypes of the created universe. In the human mind, truth is the accordance of the ideas formed by the intellectual or rational faculties, investigating the phenomena of the external world, with the divine idea of which truth is the type. Truth is thus the substitution of the intellectual and real idea or fact, for the apparent idea or fact of the senses; of the scientific fact to the crude and vulgar fact of the outward perceptions.



Man alone, of all the created beings of this world, has been endowed with the privilege of being the interpreter of the works of God, of comprehending his existence, of penetrating to the divine idea, and understanding the plan and laws of the creation.

By these means he has revealed to him the truth that is eternal. Whoever has his mind stored with truth partakes of the divine intelligence; his nature is refined, his existence ennobled, and he approaches to a spiritual union with his Creator.

This idea is expressed in the line the astronomer Halley applied to Newton—

*“Nec fas est proprius mortali attingere Divos.”*

No mortal is permitted a nearer approach to God.

The past history of the social and religious condition of man, as well as daily observation of their states in the present time, proves, that, in the degree in which ignorance abounds, and false ideas occupy the mind, is his existence discordant with the realities and laws of God's creation; in equal proportion does he recede from his Creator; is he the subject of vice and of crimes, of misery and suffering; he is brutalized in nature, debased in existence, and may become a veritable demon, and is himself the realization of Satan.

The progress of civilization follows the progress and establishment of truth. It is the overwhelming mass of error and the false in ideas, in beliefs, in opinions of all kinds, and on all subjects, that retains the present so-called enlightened age, bound in the strong fetters of the barbarism of the past, and corrupts all science, philosophy, and religion, with grossest fallacies, the vilest quackeries and superstitions, contemptible for the meannesses and poverty of their ideal conceptions.

It is no exaggeration to assert, that from the nursery to the dawn of manhood, there are implanted in the minds of the young, twenty false ideas, opinions, maxims, and examples, to one that is true. The first impressions, the earliest received ideas, are those that exert the greatest and longest influence over the masses of mankind.

Invigorated and expanded by constant repetition, they form the whole intellect, moulding the character, and controlling the thoughts and actions of the individual. •

Hence it is that the deepest convictions and most cherished opinions and beliefs are inherited, descending from parents to children, and are propagated through our early association, whether of families, sects, tribes, or nations.

They depend on the accidents of birth, they are not born of reason, or are the offspring of thought.

The governing motives and prevailing modes of thought, the springs and impulses to action now predominant in the whole civilized and Christian world, are identically the same as those of pagan Greece, and Rome, and of the barbarian nations that underlie all the present European nationalities. They have descended by hereditary tradition; and at no time have they exerted more powerful influences over governments, nations, states, churches, sects and individuals, than in the present day.

They have successfully resisted the introduction, as a rule of life, the truly philosophic maxim inculcated as the fundamental law of Christian morality, "Do unto others as you would they should do unto you." This maxim, that sums up all morality, exists in abeyance, though promulgated 1900 years, ignored and nullified by the Christian world, with whose customs, prevailing ideas, established interests, civil and political ordinances, it is in open conflict.

Is it not true that millions and millions of Christians have lived and died ignorant that this maxim had been expressly inculcated and enjoined as the golden rule of Christian life.

Could it be possible that this maxim, incontrovertible in its truth, simple in expression, yet of immense magnitude in its import, should be ingrafted in the intellect of the masses as a profound conviction and an imperative rule, the impulse to the progress of civilization and promotion of human happiness would surpass all possible calculation.

The idea of reorganizing the social state, has been for some years prevalent amongst European and American philanthropists in the expectation of effectually eliminating from it a large portion of the ignorance, misery, and crime that exists; most of the schemes proposed are impracticable and Utopian.

Emile Girardin, in a remarkable work, *Politique Universelle*, takes the gospel rule for the corner-stone of his construction. He proposes to force a knowledge and a conviction of this moral truth on every mind; and this is to be effected by associating it with man's daily thoughts, and with every transaction of his life. "The evils created by society, as constituted by man, would disappear," he asserts, "by the universal observance of that incontestable precept. It should be written on all the walls of cities, upon all the doors of tribunals, stamped on the reverse of coins, inscribed at the

head of all contracts, and impressed on the memory of all children, that it become the rule of all men without exception."

There is philosophy in this suggestion. Ideas and thoughts brighten and strengthen by reiteration; and man is what are his fixed and most intense ideas, thoughts, and convictions.

Even a falsehood frequently repeated, acquires so much force and vividness, as to be confounded with truth, as to produce in the mind the conviction of a truth from which it cannot be distinguished.

This psychological fact is happily exemplified by Shakspeare:—

"Like one  
Who having, unto truth, by telling of it,  
Made such a sinner of his memory  
To credit his own lie."—*TEMPEST*, Act I., Scene 2.

The barriers opposing the entrance of scientific truth into the mind, and the progress of science, are not less powerful and difficult to be broken down, than has been shown are existing in moral and religious truth and science.

Every new fact and doctrine adverse to those generally received, is repelled and rejected by those whose ideas and opinions have been firmly settled. Truth, it may be said, never advances by a change of opinions; by the conversion of those who have been educated in and have acted on opposing views and systems.

Its progress is by generations, and seldom is it established in the lifetime of its promulgator. There are too many interests involved, too much self-love wounded, and preconceived ideas to be destroyed, to admit of the prompt reception and adoption of new thoughts, or facts, or ideas, however true they may be.

Newton, from his personal experience, with some bitterness of feeling, remarked "that a man must either resolve to put out nothing new, or to become a slave to defend it."

The greatest difficulty in the investigation and discovery of truth in science, consists in the complexity of the phenomena to be observed, and the limited, partial, and imperfect manner in which the observation and investigation must be carried on, from the finiteness of the human intellect, and deficiency in knowledge.

In the divine mind there exists but one truth, one phenomenon. They are the whole universe. There are no divisions of truths and sciences. This thought was expressed somewhat differently a century since by the celebrated geometrician and philosopher, D'Alembert. He observes, "the universe to him who could em-

brace it in a single point of view, if it might be said, would be but a single fact and a great truth."

The finite faculties of man are incapable of entertaining this vast and comprehensive thought. They can embrace only portions of this one truth, of this single fact.

These are artificially arranged into a number of distinct sciences, and are cultivated separately; but such distinctions do not exist in nature. The separate truths of our sciences are parts of the one truth that pervades, and the one science that embraces all nature.

They are, nevertheless, indispensable to enable the human mind to work out and to master the innumerable mass of facts or phenomena that are the exponents of truth, and the elements of science.

Such, however, is the close connection of the sciences with each other, that a knowledge of one or more branches is necessary, properly and adequately to investigate another, and to understand the true character and just value of its facts. A few years past the intimate connection between agriculture and chemistry was unknown. By far the larger portion of uneducated, practical farmers, are still wholly ignorant of the subject, or cannot comprehend it, and regard it as idle.

Physiology, after the period of Haller, and the remark is equally applicable to all medical science, had come to a dead halt. Its available facts had been exhausted, yet nothing was completed. But since the phenomena of living beings have been recognized, as respects the greater portion of them, to be identical with those of chemistry, physics, mechanics, and dynamics; that they are to be investigated by the modes of experimentation that belong to those sciences, and are subjects of the same laws, the progress in the development of physiological truth is most rapid.

Even physiology itself, until its recent association with the positive sciences, had but a slight connection with the practice of medicine. Its contributions were principally, vague notions on excitability, irritability, sensibility, which were made the bases of the theories, or rather hypotheses of Hoffman, Cullen, Brown, Darwin, Rush and Broussais, none of which survived their authors. The physiology of the present day, embracing within its range the collateral positive sciences, is daily becoming the key to the observation of the facts of pathology and therapeutics.

Like all sound opinions, the unity of truth and the sciences is not of modern origin, but was seen and foreshadowed by gifted intellects at an early period.

In the following quotation from an inaugural address of the late elegant poet, Campbell, is an exemplification of this assertion. "One science and literary pursuit throws light upon another, and there is a connection, as Cicero remarks, among them all." "*Omnes artes quæ ad humanitatem pertinent, habent quoddam commune vinculum et quasi cognatione quadam inter se continentur.*"

Demonstrated science, that is the philosophical or rational co-ordination of the facts of a science, and truth are identical. They are each the interpretation by man's intellectual faculties of the ideas of the Divine intelligence expressed or contained in the complex phenomena of nature. In this view is to be seen and understood Bacon's expression, "the Supreme dignity of science." In the eye of wisdom, the illustrious cultivators of science and discoverers of scientific truths, are the noblest and most illustrious of men.

Linnaeus, in his *Systema Natura*, expresses a coincident thought in the following words:—

"The true nobleness of man, the eminent character of his superiority over animals, is to observe, to reason, to conclude: in this way he is endowed with the privilege of knowing and admiring the works of the Creator."

He who has discovered and demonstrated the truth of a fact in any science, has had revealed to him the Creative Idea; but he who has solved and established a *law* in science, has had unfolded to his mental view the interior thought of God.

Such men are true oracles and prophets. They do not utter doubtful phrases: "*Ambiguas in vulgum, spargere voces.*" Their teachings of revealed truths descend to and enlighten future ages. They justify the bold expressions of Pliny: "*Viri ingentes supraque mortalia.*"

Medical science and medical truths are no more than parts of the one universal science and truth. Man is not an independent existence *in* nature. He is *of* nature, compounded of the same matter, the subject of the same forces, the seat of the same actions and phenomena, and is controlled by the same laws as are all material bodies. The physiological sciences cannot be separated from other sciences: physiological facts are not to be treated differently from other facts. They are to be investigated, by the same processes of observation, of experimentation, by analysis and by synthesis, the application of chemical and physical instruments and methods, that are employed in the positive sciences.

Those who undertake to study them should, consequently, possess



some general information of the principles of those sciences. A minute knowledge of the sciences themselves is not indispensable; but when the facts and principles of those sciences as they exist in man, are the subjects of examination and discussion, deficiency of that knowledge must embarrass and perplex his mind; for a fact or principle of chemistry, physics, mechanics, or dynamics, occurring as a physiological fact or principle, cannot be comprehended by one wholly uninformed in the special sciences, to which it belongs, and in which it is treated.

The ingenuous truth-loving student, ambitious of knowledge and the distinctions it confers, requires no other incentive to supply his deficiencies, than to be convinced of their existence. He will not rest until he has removed the impediment he finds arrests his progress, and are obstacles to his advancement.

Since the identification of so large a portion of physiological facts—the facts of organic or vegetative life, with chemical and physical facts, and the correlation established between the physical forces, and what, in the organic functional actions have been heretofore designated as vital forces—the positive sciences have become the material foundation of medicine; and it has entered into the circle of the positive sciences.

Like them, it refuses admission into its domain of conjectural statements, opinions, or facts. It repels whatever does not possess the sanction of the rigid canons of sound logic, demonstration and experiment. In this connection medicine is a science, for, let it be observed, a science does not consist in the accumulation of facts, but the interpretation, the signification of facts and their concordance with observed laws. And such is the character that medicine is rapidly assuming.

Whoever would move on with the science of medicine in the line of its advancement, must study and follow it in this connection. Out of it medicine, such as it was in the time of our immediate predecessors, is an enlightened empirical art, but is not a science; it possesses no established principles, no verified theories. In its literature it is rich and varied, its stores of well-observed facts are inexhaustible, it is full of recorded experience, enlightened and expanded; it has accumulated an immense mass of the material for scientific development, but unable from its own resources to evolve them by a just interpretation of their truth, into a body of science. The former medicine has exhausted its own resources and capabilities of penetrating into the inner recesses of its own phenomena or

of dealing appropriately with its own facts; it cannot solve them. No advance has been made for the last half century, except in the adoption of new contributions of remedies furnished by chemistry, and application of physical examination and signs in diagnosis, and no further scientific advance in the old path is possible.

Modern medicine, incorporating within itself the collateral sciences, has had imparted to it an activity and energy before unknown. None of the phenomena of organic life can resist its powers of investigation, or the accuracy of its researches. The mass of the obscure, the hidden, is rapidly diminishing, and in no distant day will have disappeared. Never was a more glorious field laid open to the culture of man's genius, or promising higher rewards of scientific fame and honor, as the fruits of intellectual labor. The student on the benches, armed with the power of this knowledge, before his diploma has been conferred, will gather trophies in science that would grace the brows of professors.

In the last half century the application of the positive sciences to the purposes of social life is daily advancing the progress of civilization, is augmenting man's power over nature, is multiplying his productive force, and rapidly advancing the material interests of society. The machine production of great Britain is estimated at double the population of China—supposed to be 350 millions.

It is impossible to foresee and predict what will be the ultimate result of the embodying of the physical sciences into medicine, carrying with them and imparting to it their truthful facts, their established laws, their admirable methods and means of experiment, examination and researches. By their aid, the inscrutable to our senses becomes patent, the mysterious is changed to the natural, conjecture is replaced by positive fact, and loose hypotheses are no longer tenable.

To this union we owe the knowledge of the physical signs of disease, by which the diagnosis of thoracic and many abdominal diseases, formerly vague and unsatisfactory, have acquired, in accomplished hands, almost absolute certainty.

Urology is another acquisition of immense value. By a complete acquaintance with the physical and chemical characters and constituents of the urine, the interior chemical actions are proved.

It shows the waste, the chemical disintegration, that is taking place in each tissue; informs us whether normal or abnormal; the kind of waste occurring; and also indicates the functional derangements of the digestive and respiratory organs.



The limits of this discourse, already too extended, will not permit an enumeration of the numerous benefits already derived by the conjunction of physical sciences to medicine.

Permit me, however, to state, that they have demonstrated the primary—sometimes named ultimate facts of medical science. The attempts to explain, or to demonstrate the active phenomena of any science, is impracticable until its primary facts are known.

They are included in every organic action; they lie at its roots; they are the axioms or elementary facts essential to the solution of every living organic action.

These facts are, first, the organic materials of which organized structures are formed; and, second, the primary organic form of every tissue.

In this discourse I have, unconsciously, fallen into a grave mode, and possibly too severe a train of thought. It is not, however, irrelevant to the occasion or the times.

Many young gentlemen commence the study of medicine with the impression that a medical education is perfectly similar to the discipline of common schools. They suppose, and it is a very general belief out of the profession, even amongst the best educated, that it consists in committing to memory established facts, demonstrated formulas of phenomena, appropriate rules of proceeding, and a routine treatment of disease, settled by experience. Nothing more, of course, is required for such a programme, than a retentive memory and assiduous application. This most erroneous conception of the character of medicine, and a medical education, sustains the wide-spread quackery that overshadows the profession, and riots through the land.

It is well you should be warned beforehand, that while a great amount of truthful facts have been won in medical science, particularly in its statistics, that is, in organic structure, normal and abnormal, yet, when we come to the study of the living and acting organisms, or its dynamical phenomena, in health and disease, and influenced by therapeutic agents, the amount of the unsettled, the contested, the absolutely unknown, the truth of which is yet to be ascertained, is immense. Cullen, in his *Materia Medica*, says that medicine is filled with false facts. The statement is correct to this day.

How is it, you may inquire, that after so many centuries during which medicine has been cultivated, and so many truly eminent men have been engaged in its investigation, that so much of the false and unknown should exist, and so little comparatively of

truth should have been established? The solution is not difficult. It proves, in the first place, the abstruseness of medicine and the complexity of its phenomena. These are varied, diversified, wholly different from each other in their nature and characters.

They cannot be seen correctly, or properly understood, regarded from one point of view.

Such, however, has been the method followed from the time of Hippocrates to our own day.

With some few exceptions, the phenomena of living beings have been observed and studied in a vital point of view. They were explained as the immediate, direct results of a vital force or principle, though no one could define what were the distinctive characters of a vital phenomenon that distinguished it from all others. To explain a phenomenon by asserting it to be the result of a vital action is a deception. It is an attempt to explain the unknown by what is itself unknown.

Gaubius, Silvius, and others, recognized, amongst the phenomena of living animals, chemical phenomena. On this they assumed the fact that all living phenomena were chemical. Their stand-point was chemistry; and they attempted to explain the living actions by their chemistry, a towering mass of hypotheses, erected on a narrow base of facts.

Borelli worked out the beautiful mechanical problems solved in the structure of the muscular system. But, instead of stopping at this point, he and his disciples formed a mechanical hypothesis explanatory of the whole phenomena of vitality. Time will not admit to multiply illustrations.

It was the universal vice of all speculators down to the last, the propounder of the absurd, utterly groundless, and futile abortion of homœopathy, to believe that medicine could be no other than what they were enabled to comprehend, and who with vain audacity attempted to dwarf its magnificent proportions to the narrow compass of their ignorance and capacity.

It was not until modern science, by its advances and discoveries in the various collateral departments of chemistry and natural philosophy, and the improvements of the microscope and other instruments and methods of physical research applied to the solving of living phenomena, that physiologists and practitioners were able to recognize the chemical, physical, and other phenomena existing in the animal organism, intimately associated with and indispensable to the maintenance of vitality.

Now, gentlemen, if you enter into this vast field of investigation no better prepared by a competent knowledge of the collateral sciences, the phenomena and laws of which, as they exist and are operating in living organisms, and are the subjects of observation and study, you cannot advance in medical knowledge beyond our predecessors. You will occupy the same position, view the phenomena observed in the same light, understand them in the same manner, and must revolve in a circle without progression.

The time has arrived when your choice must be made. The former science is full of honor, dignity, and renown; it is endowed with accumulated stores of knowledge and an immense collection of well-observed facts, and an admirable systematized practice.

It must continue to form the body of medical science, but it has reached the full development of which it is susceptible from its innate powers.

Your professional development, should you confine yourselves to former methods and inclose yourselves within the circle that has so long been the boundary of medical knowledge, will be, like it, stationary.

Medicine cannot advance to its high destinies, rising into the higher regions of positive science inaccessible to the efforts of quackery, except by the energies, activity, and vitality of the collateral sciences incorporated with it into a single science.

By this union medicine acquires the capability of examining by direct experiments, and of interpreting a large amount of hidden phenomena, of throwing light on its most obscure and recondite facts, and establishing experimental results instead of opinions and suppositions.

Let me urge you to enter on this course and to labor in this great mission. You will be occupied in no mean office; for, guided by the "Spirit of Truth," you will be enlisted in the noblest duties and the highest obligation man is summoned to accomplish in this world, the building up and establishing the "Kingdom of Truth."

